

Customer No.: 31561
Application No: 10/605,055
Docket No.: 10658-US-PA

REMARKS

Present Status of the Application

This is a full and timely response to the outstanding nonfinal Office Action mailed on January 12, 2006. The Office Action has objected to the title of the invention. The Office Action has also rejected claim 1 under 35 U.S.C. 103(a) as being unpatentable over Ho et al. (USP 6,05,621) in combination with Lee et al (USP 6,653,028) and to claims 2-10 under 35 U.S.C. 103(a) as being unpatentable over Ho in view of Lee and further in view of Blatchford, Jr. et al. (USP 6,680,150). Upon entry of the amendments in this response, claims 1-10 remain pending.

After carefully considering the remarks set forth in this Office Action and the cited references, it is however strongly believed that the cited references are deficient to adequately teach the claimed features as recited in the presently pending claims. The reasons that motivate the above position of the Applicant are discussed in detail hereafter, upon which reconsideration of the claims is most earnestly solicited.

Discussion of Office Action Objections & Rejections

The Office Action has objected to the title of the invention as being not descriptive.

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In this regard, Applicant has amended the title of the invention according to the suggestions offered by the Examiner. It is respectfully requested that this objection be withdrawn.

The Office Action has rejected claim 1 under 35 U.S.C. 103 (a) as being unpatentable over Ho et al. (USP 6,905,621, "Ho" hereinafter) in combination with Lee et al. (USP 6,653,028, "Lee" hereinafter).

Applicants respectfully assert that Ho in view of Lee is legally deficient for the purpose of rendering claim 1 unpatentable for at least the reason that not every element of the claim was taught or suggested by cited references such that the invention as a whole would have been obvious to one of ordinary skill in the art.

Claim 1 teaches, "[a] mask for fabricating contacts, comprising: a contact pattern having a photo-exposure region; and an edge pattern at the edge of the contact pattern, wherein the edge pattern is a half-tone region".

On the other hand, Ho teaches a method of removing sidelobes in which a positive photoresist layer is patterned with an Att. PSM, Alt PSM, etc. in which regions 33 and 34 as shown in Figure 2a of Ho transmit light that is 180° out of phase with an adjacent region. As recognized by the Office, Ho is completely silent about an edge pattern at the edge of the contact pattern, wherein the edge pattern is a half-tone region.

The Office, however, asserted that "it would have been an obvious matter of design choice to choose any desired materials for use as the edge of the contact pattern since applicant

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has not disclosed that the edge pattern is a half tone region is a critical, patentably distinguishing feature...". Applicant respectfully traverses the rejection and the rationale of the rejections for at least the reasons discussed below.

First of all, the present invention is not directed to a selection of certain desired materials for use as the edge of the contact pattern. Instead, the present invention teaches that it is the edge pattern of the contact pattern that produces the half tone effect. As recited in [0026], "the half-tone region is an area with a specially designed edge pattern for producing half-tone exposure effects." Moreover, it is critical that the edge pattern of the present invention is a half tone region because, as a result, the opening formed in the photoresist layer will have a gentle slope, for example, the sidewalls of the opening 209 and the underlying dielectric layer 104 form a contact angle θ smaller than 70° (please refer to [0034]).

The Office also asserted that "it appears that the invention would perform equally well with the edge pattern is a PSM ...". Applicant again respectfully disagrees with such an assertion. Ho teaches a method for removing sidelobes that are formed when patterning a positive photoresist layer with an Att. phase shift mask, Alt. phase shift mask or a binary mask. There is no where in Ho that suggests a mask with an edge pattern that produces a phase shifting effect at the edge of the contact pattern, let alone a half-tone effect. Applicant would courteously remind the Office that "[i]t is never appropriate to rely solely on 'common knowledge' in the art without evidentiary support in the record, as the principal evidence upon which a rejection was based. *Zurko*, 258 F.3d at 1385, 59 USPQ2d at 1697." – MPEP 2144.03.

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Regarding Lee, Lee simply teaches a photomask for a half tone exposure process. Again, there is no where in Lee that either teaches or suggests that an edge pattern at the edge of a contact pattern is a half-tone region.

Therefore, even if there were motivation to combine Ho with Lee, with the fact that neither Ho nor Lee teaches or suggests an edge pattern at the edge of the contact pattern, wherein the edge pattern is a half-tone region, the combination of Ho with Lee still fails to render the claim 1 obvious. Thus, reconsideration and withdrawal of the rejection are respectfully requested.

The Office Action has rejected claims 2-10 under 35 U.S.C. 103(a) as being unpatentable over Ho in combination of Lee and further in view of Blatchford, Jr. et al. (USP 6,680,150, "Blatchford, Jr." hereinafter).

With regard to the 103 rejection of claims 2-10 by Ho in view of Lee and further in view of Blatchford, Jr., Applicants respectfully submit that these claims defined over the prior art references for at least the reasons discussed above. Since claims 2-10 are dependent claims, which further define the invention recited in claim 1, Applicant respectfully asserts that these claims also are in condition for allowance.

Moreover, Blatchford Jr. simply teaches forming various-engineered contact openings in an attenuated phase-shift mask, and the openings being star-shape, cross-shape, diamond shape, etc.. Accordingly, having a configuration with 4-5 extending vertices like the contact openings of Blatchford Jr. can not be construed of having notches along the edge like the teeth of a saw as

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taught in claims 2-4 of the instant case. Further, the shape-engineered contacts of Blatchford Jr. include a transmissive area bounded by a material in which light transmitted therethrough is phase shifted. In essence, Blatchford Jr. also fails to teach the edge pattern at the edge of the contact pattern is a half-tone region. In addition, the edge pattern being a concentric circular patten, a spiral pattern or a polygonal mosaic edge pattern, etc. as taught in claims 4-10 are not a mere change in the size of a component. These patterns are unique in context of the teachings of the present invention, and thus can not be generally recognized as being within the level of ordinary skill in the art as alleged by the Office.

Therefore, even if Ho is combined with Lee and Blatchford, Jr., the combination still fails to teach or suggest claims 1-10 of the claimed invention. Favorable consideration and allowance of the present application and all pending claims are hereby courteously requested.

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CONCLUSION

For at least the foregoing reasons, it is believed that the presently pending claims 1-10 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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Respectfully submitted,


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